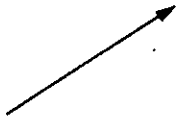
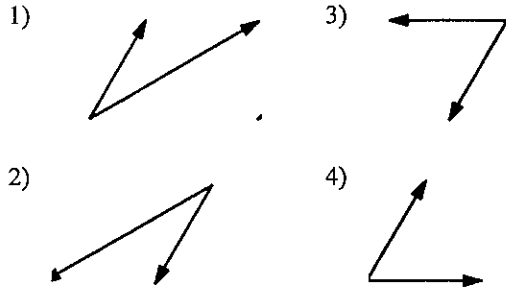


2D Vectors

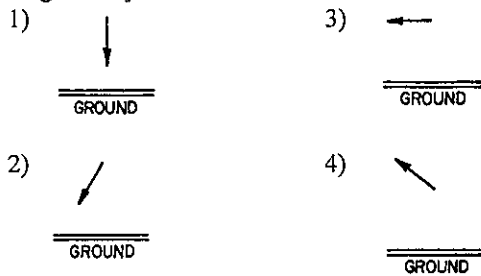
1.



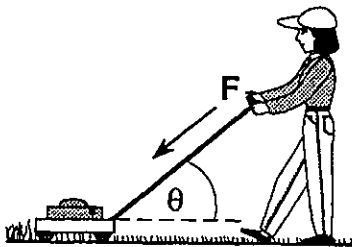
If the force vector shown in the diagram above is resolved into two components, these two components could best be represented by which diagram below?



2. Which diagram represents the vector with the largest downward component? [Assume each vector has the same magnitude.]



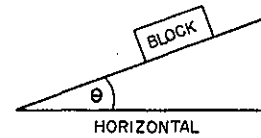
3. A lawnmower is pushed with a constant force of F , as shown in the diagram below:



As angle θ between the lawnmower handle and the horizontal increases, the horizontal component of F

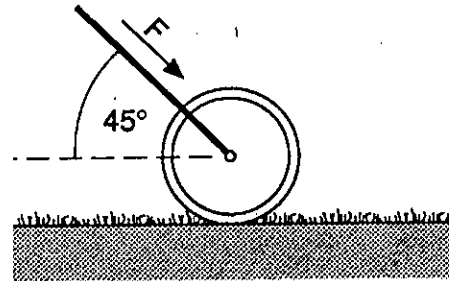
- 1) decreases
- 2) increases
- 3) remains the same

4. A block is at rest on an inclined plane as shown in the diagram at the right. As angle θ is increased, the component of the block's weight parallel to the plane



- 1) decreases
- 2) increases
- 3) remains the same

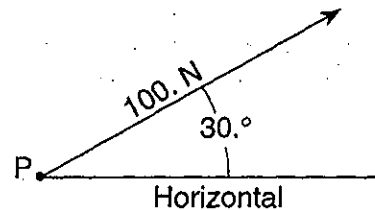
5. The handle of a lawn roller is held at 45° from the horizontal. A force, F , of 28.0 Newtons is applied to the handle as the roller is pushed across a level lawn, as shown in the diagram below.



What is the magnitude of the force moving the roller forward?

- 1) 7.00 N
- 2) 14.0 N
- 3) 19.8 N
- 4) 39.0 N

6. A 100.-newton force acts on point P , as shown in the diagram below.



The magnitude of the vertical component of this force is approximately

- 1) 30. N
- 2) 50. N
- 3) 71 N
- 4) 87 N

2D Vectors

7. The vector below represents the resultant of two forces acting concurrently on an object at point P .



Which pair of vectors best represents two concurrent forces that combine to produce this resultant force vector?

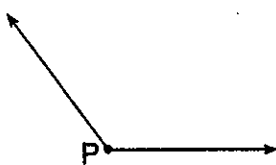
1)



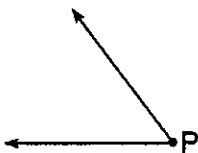
2)



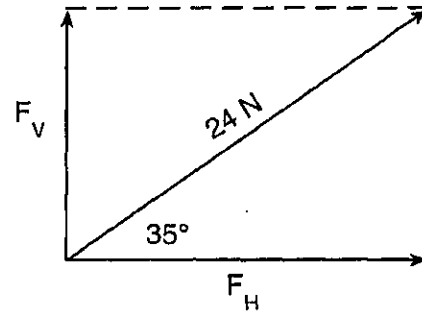
3)



4)



8. The vector diagram below represents the horizontal component, F_H , and the vertical component, F_V , of a 24-newton force acting at 35° above the horizontal.



What are the magnitudes of the horizontal and vertical components?

- 1) $F_H = 3.5 \text{ N}$ and $F_V = 4.9 \text{ N}$
- 2) $F_H = 4.9 \text{ N}$ and $F_V = 3.5 \text{ N}$
- 3) $F_H = 14 \text{ N}$ and $F_V = 20. \text{ N}$
- 4) $F_H = 20. \text{ N}$ and $F_V = 14 \text{ N}$

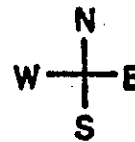
9. A 5.0-newton force could have perpendicular components of

- 1) 1.0 N and 4.0 N
- 2) 2.0 N and 3.0 N
- 3) 3.0 N and 4.0 N
- 4) 5.0 N and 5.0 N

10. Two students are pushing a car. What should be the angle of each student's arms with respect to the flat ground to maximize the horizontal component of the force?

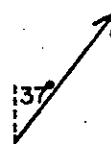
- 1) 0°
- 2) 30°
- 3) 45°
- 4) 90°

11. An object is displaced 3 meters to the west and then 4 meters to the south.

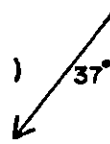


Which vector shown below best represents the resultant displacement of the block?

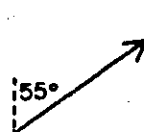
1)



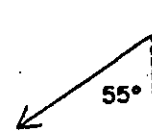
3)



2)



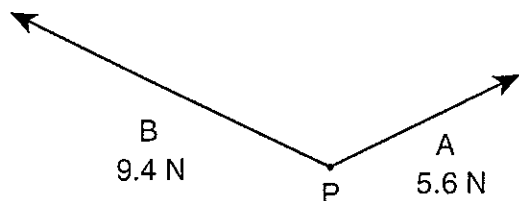
4)



2D Vectors

Base your answers to questions 12 through 14 on the information and diagram below.

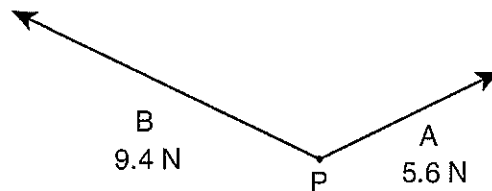
Force A with a magnitude of 5.6 newtons and force B with a magnitude of 9.4 newtons act concurrently on point P .



12. Determine the scale used in the diagram.

1.0 cm = _____ N

13. On the diagram below, use a ruler and protractor to construct a vector representing the resultant of forces A and B .



14. Determine the magnitude of the resultant force.

2D Vectors
Answer Key
[New Exam]

1. 4

2. 1

3. 1

4. 2

5. 3

6. 2

7. 4

8. 4

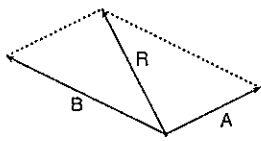
9. 3

10. 1

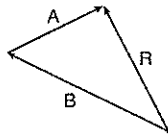
11. 3

12. $2.0 \text{ N} \pm 0.2 \text{ N}$

13.



or



Construct the
resultant $3.7 \text{ cm} \pm 0.2 \text{ cm}$ long, at an angle of $36^\circ \pm 2^\circ$ from
vector B .

14. $7.4 \text{ N} \pm 0.4 \text{ N}$
